Compliance Guide for MSHA's Safety Standards for the Use of Belt Entry As an Intake Air Course to Ventilate Working Sections and Areas Where Mechanized Mining Equipment is Being Installed or Removed

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U.S. Department of Labor
Mine Safety and Health Administration

September 2004

Introduction

Mandatory Safety Standards

INTRODUCTION

The final rule title is "Safety Standards for the Use of a Belt Entry as an Intake Air Course to Ventilate Working Sections and Areas Where Mechanized Mining Equipment Is Being Installed or Removed." This rule will allow all mine operators the option of using belt air as intake air on working sections or in areas where mechanized mining equipment is being installed or removed in areas developed with three or more entries. In all cases, the requirements for use of belt air "on working sections" and "areas where mechanized mining equipment is being installed or removed" are the same. In this compliance guide, we will address these locations as "working sections" and "setup and removal areas."

In areas of mines to be developed with two entries, mines must still apply for a petition for modification to use the belt entry as an intake air course and must still comply with all requirements set forth in the granted two-entry petition after this final rule becomes effective. When a two-entry petition mine develops outby areas with three or more entries in outby areas of the mine, the provisions of this rule would apply in these outby areas.

As of June 1, 2004, all granted petitions for modification to use belt air in areas of mines developed with three or more entries were superceded by this rule. This rule will also allow all coal mine operators to add additional intake air to the belt air course through point-feed regulators once the location and use of the point feeds are approved in the mine ventilation plan. When belt air is used on working sections or setup and removal areas, additional safeguards for point feeds apply under § 75.350(d).

With two exceptions, the requirements of this final rule were effective June 1, 2004. These two exceptions, §§ 75.351(e)(3) (sensor spacing) and 75.351(r) (communications), were effective August 2, 2004.

WHO CAN BE AN AMS OPERATOR?

An AMS operator is defined in § 75.301. For any shift when personnel are working underground and the AMS is being used to comply with §§ 75.323(d)(1)(ii), 75.340(a)(1)(ii), 75.340(a)(2)(ii), 75.350(b), 75.350(d), or 75.362(f), the AMS Operator must be on duty and able to respond to signals produced by the Atmospheric Monitoring System. The AMS Operator must be trained properly, is expected to be knowledgeable about the operation of the AMS, and should have a working understanding of how the AMS is integrated with the overall mining system.

If a mine operator chooses to hire a security contractor to fulfill the duties of AMS operators, these persons must be trained in accordance with § 75.351(q) to adequately respond to AMS signals, including malfunction, alert, or alarm signals. The cornerstone for safely using belt air as intake air to ventilate working sections and setup or removal areas is the proper installation, operation, maintenance, and examination of an AMS. Therefore, the AMS operator's performance is critical in safely using belt air to ventilate working sections and setup and removal areas, and he/she must be trained accordingly.

WHO ARE APPROPRIATE PERSONNEL?

Appropriate personnel are defined in § 75.301. Appropriate personnel will be different individuals depending on the type of signal and the location where the signal originates. In certain mines, an AMS operator may not be considered an appropriate person. For example, a mine operator may require the AMS Operator only to receive signals from the AMS and report the signals to appropriate personnel which could include maintenance personnel, miners, company officials, and ultimately, the responsible person designated under § 75.1501 (Emergency Evacuations) whose duty it is to take appropriate actions in response to these signals.

For example, in a particular mine, the AMS Operator may be trained to call a maintenance person in the event of a malfunction. This maintenance person would be considered an appropriate person. In this same mine, if the AMS indicates an alert CO level, it may be appropriate for the AMS Operator to notify the mine foreman and the closest miner to the alerting sensor so that an investigation can be quickly initiated. In this instance, the mine foreman and the closest miner to the alerting sensor would be considered appropriate personnel. In some cases, the AMS Operator may notify the affected miners in the event of an alert signal and these miners would be considered appropriate personnel.

WHAT IS A BELT AIR COURSE?

Belt air course is defined in § 75.301. An important aspect of this definition is that the air course may not contain the belt throughout its entirety. Because the air course may split, one of the splits may not include the belt. The air course is still considered a belt air course for the purposes of this rule until the air is coursed into a return air course, reaches a section loading point, or is vented to the surface. Therefore, this air course cannot be used to ventilate working sections or setup and removal areas unless it is monitored according to provisions of the final rule.

WHAT IS THE CARBON MONOXIDE AMBIENT LEVEL AND WHAT METHOD SHOULD BE USED TO DETERMINE THIS LEVEL?

The carbon monoxide ambient level is defined in § 75.301. Because many ambient levels and methods have already been approved by the district managers, most mines will not need to alter their current practice for determining ambient(s) when submitting ventilation plans. Although a single specific method is not required by the rule, the operator must provide sufficient information for the district manager to fully evaluate the merits of the mine's ventilation plan submission. More than one ambient level may be approved in the mine's ventilation plan because the mine operator may establish separate ambient levels for different areas of the mine as dictated by specific mine conditions.

As an example, if a mine operator submits that the ambient level in the entire belt air course is zero parts per million, the district manager could promptly approve the ambient. However, if the operator later requests that the ambient has changed to 6 ppm in the same mine, the district manager will require data to be supplied to evaluate the request, and would have inspectors verify the data during a mine visit.

If a second mine operator requests that an ambient carbon monoxide level be established at 8 ppm during a longwall setup, then data from a previous longwall setup will be required to be submitted by the MSHA district manager for review. Data from installed CO sensors, as recorded by a properly installed and calibrated AMS, could be submitted to document the need for a higher ambient level. The data should include readings for all sensors involved in the submission for a number of similar shifts of activity. A single shift of data would not be considered adequate to fully evaluate the plan submission. We would expect at least five consecutive shifts of activity to fully demonstrate the ambient level.

Excessive CO levels due to poorly-maintained diesel-powered equipment must not be compensated for by elevating ambient levels. Diesel engines must be properly maintained and repaired as needed prior to making a determination of the ambient levels.

WHAT IS POINT FEEDING AND HOW IS IT USED?

Point feeding is defined in § 75.301. Point feeding the belt entry with air from another intake entry is permitted by the final rule for all mines in § 75.350(c). § 75.350(d) lists additional requirements the mine operator must meet to

implement point feeding if belt air is being used on the working sections or in setup and removal areas.

Figure 1 includes three examples of section ventilation systems. In Example A, the point feed is intended to supply additional air to the belt entry which is used to ventilate the working section and must comply with §§ 75.350(c) and (d). In Example B, air is introduced to the belt entry inby the section loading point and taken outby to a return or the surface. This is not point feeding because the air being introduced in this example is introduced inby the section loading point and therefore is not part of the belt air course. In Example C, air is coursed through a regulator located in the first cross-cut outby the section loading point into the belt entry and is coursed outby. The point feed in example C must only comply with § 75.350(c), and conditions of approval are included in the ventilation plan.

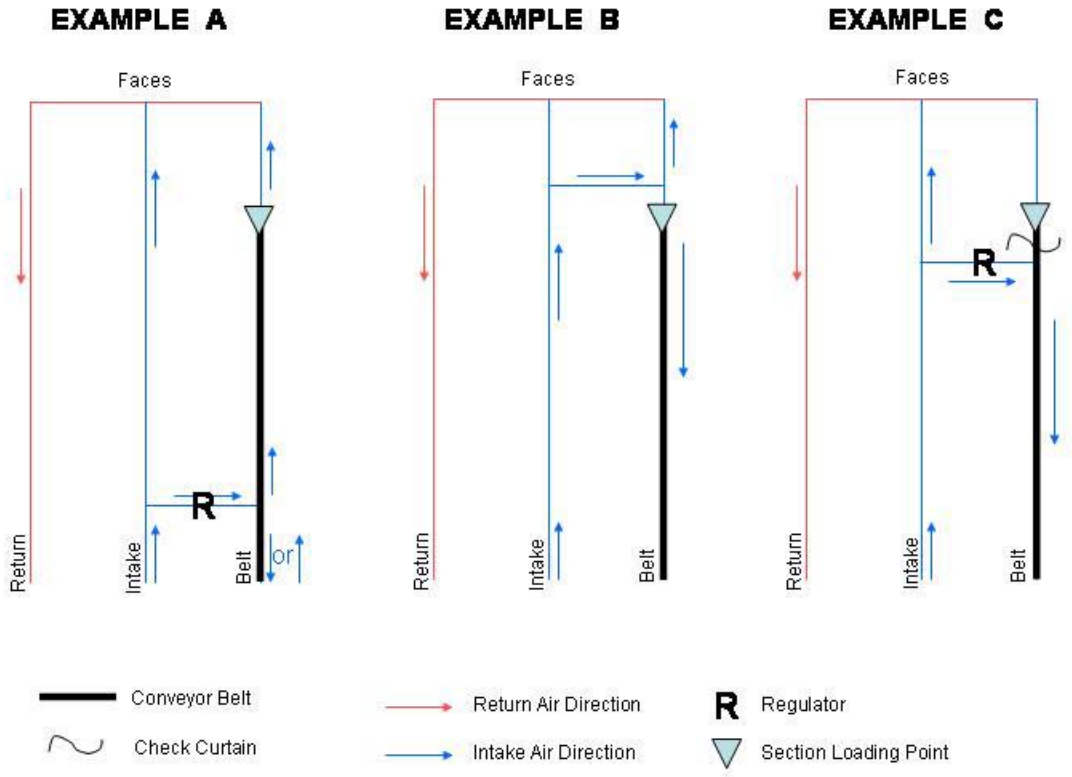


Figure 1

The use and location of all point feeds must be approved in the mine's ventilation plan. In approving the point feed locations, it would be acceptable to

include a provision of the plan to install a point-feed regulator at the mouth of each panel. The regulator design must also be specified, but can be generic in its location. For example, a mine operator may specify that each panel will utilize a point-feed regulator in the fourth crosscut from the mouth of the section between the belt and intake air courses.

As noted earlier, when point feeds are used to provide additional air to the belt entry coursed to working sections or setup and removal areas, then additional safeguards under § 75.350(d) must be implemented. These safeguards include monitoring of the point feed using the AMS. Sensors are required in both the belt air course and in the intake air course. Figure 2 depicts an example of compliance with this provision.

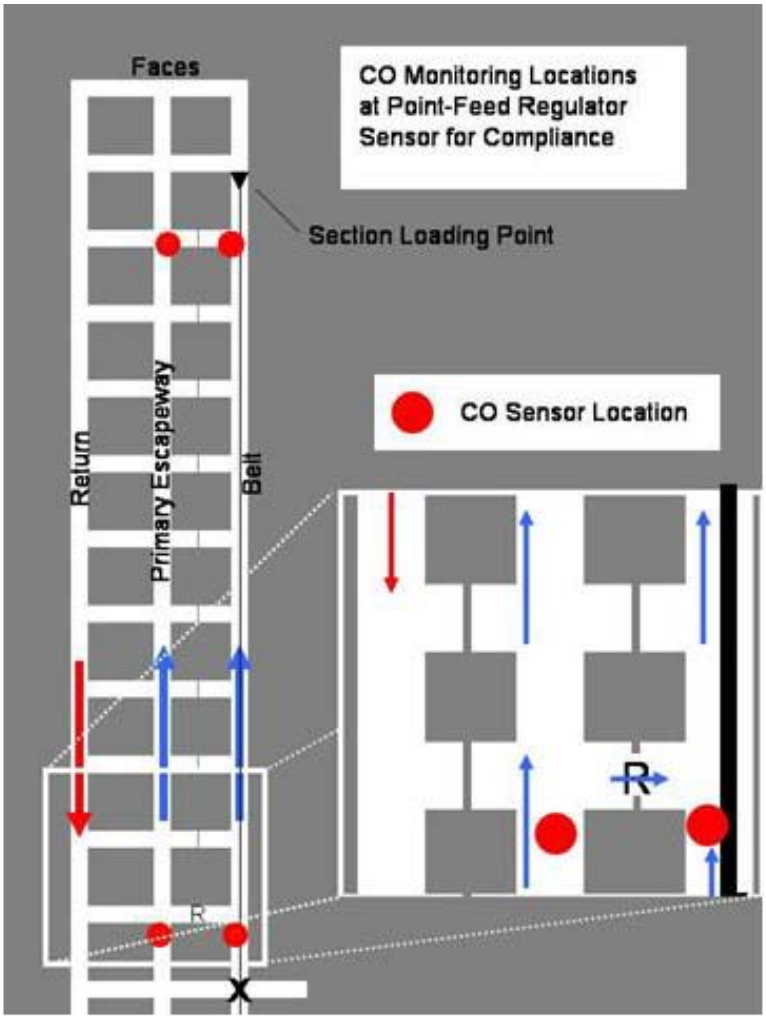


Figure 2

A minimum air velocity of 300 fpm must be maintained through the point-feed regulator. This velocity can be measured with an anemometer. This velocity

requirement will help reduce the possibility of air reversal through the regulator in the early stages of fire development.

The operator must provide a means for remote closure of the regulator in the event of an emergency. The design of the system is the responsibility of the operator. The Agency foresees that some closure designs will include a pulley system. While the closing mechanism is not required to be automatic, it is required that the door for the regulator can be closed without a miner entering the crosscut where the point-feed regulator is installed. The mechanism may be electrically powered, but in case of a loss of power must still be operable.

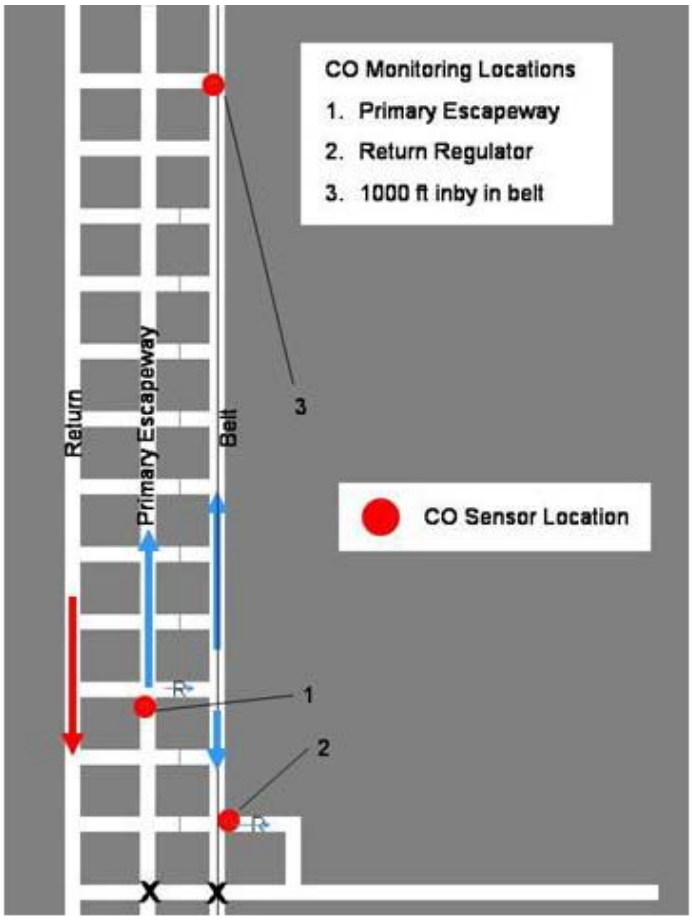


Figure 3

Figure 3 illustrates a point feed from the intake escapeway into a belt entry where the air is split, some going towards the working section and the remainder outby. The district manager should require an additional sensor (Sensor No. 2), under § 75.351(e)(5), to properly monitor the belt entry in this case. Because all of the air in the belt entry is supplied from the intake escapeway, there is no need

to monitor for CO in the belt at a location immediately downwind of the intake regulator since a monitoring location already monitors this air (sensor 1). Pursuant to § 75.351(e)(5), on the outby belt air split, a sensor may be required by the MSHA district manager at the return regulator in the dogleg (sensor 2). If this location is more than 1000 feet outby the intake regulator, additional sensors will be required so that the spacing does not exceed 1000 feet (350 feet when the air velocity is less than 50 fpm). At a minimum, a third sensor would be required in the belt entry 1000 feet inby the intake regulator and additional sensors at intervals not to exceed 1000 feet (or 350 feet in velocities less than 50 fpm) to the section loading point pursuant to § 75.351(e)(3).

The means for closure of the regulator, in case of emergency, must be located such that a person closing the regulator from the intake air course must not enter the crosscut where the point-feed regulator is located. If the air through the point feed regulator enters a belt air course which is used to ventilate a working section or setup or removal area, a means of closure must also be provided in the belt entry on the upwind side of the point-feed regulator. If the air through the point feed regulator enters a belt air course and splits inby and outby directions, there would be no location for a person to initiate closure of the regulator from the belt entry side without being in the air stream containing the products of combustion. For this reason, an alternate location capable of remote activation would be necessary. This alternate location could be near the section loading point or other appropriate location as approved in the mine's ventilation plan.

Closure of a point-feed regulator will be dependent on the conditions in the mine. As the preamble to the proposed rule indicated, we do not suggest that any air change, including closure of point-feed regulators, be made during a fire unless a demonstrated need exists.

If an alternate means of closure is approved for a point-feed regulator, such as an overhead door, the closure will provide the same separation as closure of the regulator. In addition, the structure and materials used must be substantial, and meet the requirements of § 75.333. A roll-down check curtain would not be approved for this purpose.

The MSHA district manager may require, through the ventilation plan approval process, the mine operator of non-belt air mines to meet some or all of the additional requirements of § 75.350(d) to ensure the safe use of point-feed regulators. For example, one such requirement may be to maintain the minimum velocity through the point-feed regulator above 300 fpm.

The air current that will pass through the point-feed regulator must be monitored for carbon monoxide or smoke at a point within 50 feet upwind of the

point-feed regulator as shown in Figure 4. The sensor location may be located in the crosscut as shown in cases where the distance between entries is too short to place the sensor in the intake entry.

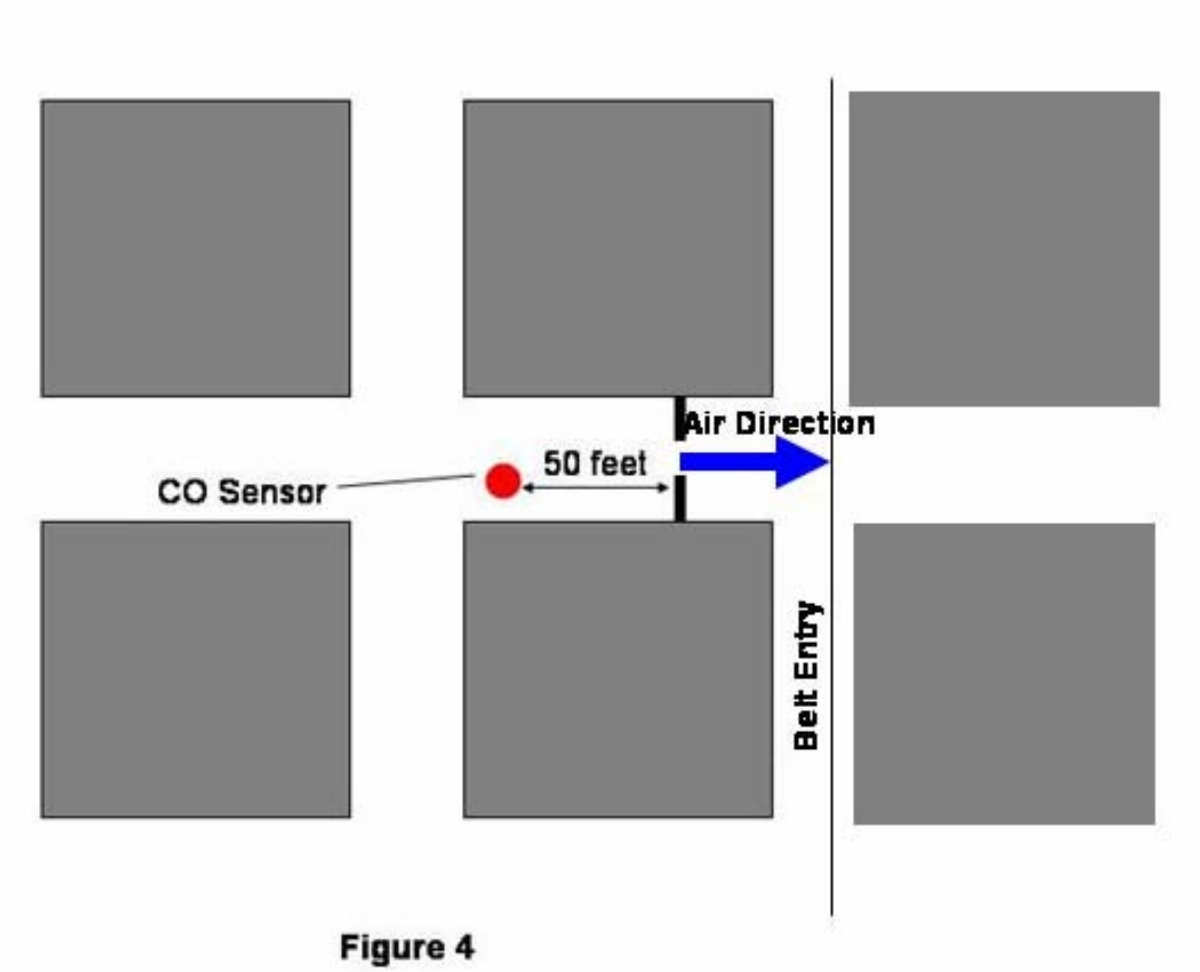


Figure 4

WHAT IS BELT AIR COURSE VENTILATION IN § 75.350?

In summary, this section will allow mine operators, provided certain safeguards are taken, to use belt air at working sections or setup and removal areas without having a granted petition for modification. Mine operators are still prohibited from placing belts in return air courses or primary escapeway intake air courses. The separation of the belt air course from other intake and return air courses by permanent ventilation controls is still required in § 75.350(a).

IS THERE A MAXIMUM BELT ENTRY AIR VELOCITY?

30 CFR § 75.350(a)(2) requires that "[t]he maximum air velocity in the belt entry must be no greater than 500 feet per minute, unless otherwise approved in the mine ventilation plan." Velocity measurements must be determined at locations in the entry which are representative of the cross-section areas found throughout the entry and not at locations where the entry is abnormally high (e.g., belt drives) or low (e.g., under overcasts). Traditional methods of velocity measurement include vane anemometer traverses (half entry), timed smoke measurements, and velometer fixed-point traverses. Airflow requirements are based on average velocities within the entry. Therefore, a traverse of the entry is required to determine the average velocity.

IS THERE A MINIMUM BELT ENTRY AIR VELOCITY?

No. However, air movement is needed to transport products of combustion from the fire ignition location to the fire detection sensor. For this reason, 30 CFR § 75.351(e)(3) requires for belt air mines that "[i]n areas along each belt entry where air velocities are less than 50 feet per minute, the sensor spacing must not exceed 350 feet."

HOW ARE FIRE DECTECTION SYSTEMS AND FIRE SUPPRESSION SYSTEMS TREATED IN THIS RULE?

30 CFR § 75.350(a)(3) requires that "[a]ir velocities must be compatible with all fire detection systems and fire suppression systems used in the belt entry."

WHAT REQUIREMENTS ARE THERE FOR ATMOSPHERIC MONITORING SYSTEMS IN § 75.351?

Section 75.351(a) specifies that "[w]henever personnel are underground and an AMS is used to fulfill the requirements of §§ 75.323(d)(1)(ii), 75.340(a)(1)(ii), 75.340(a)(2)(ii), 75.350(b), 75.350(d), or 75.362(f), the AMS must be operating and a designated AMS Operator must be on duty at a location on the surface of the mine where audible and visual signals from the AMS must be seen or heard and the AMS operator can promptly respond to these signals." To comply with this requirement, it is anticipated that an audible horn would be the primary signal for most AMS Operators with a visual signal coming from the computer screen of the AMS. Many mine operators use a dispatcher as the AMS Operator, and this person remains at a work location performing other tasks, such as running a forklift, the entire shift. As explained further in the next paragraph, assuming the work location is a designated surface location, as described in § 75.351(b),

where audible and visual signals from the AMS are seen or heard and the AMS Operator can promptly respond to these signals, this would be acceptable.

Section 75.351(b) details the requirements for designating a surface location and designating an AMS Operator. For example, a mine operator may designate the area in and around the building that houses the AMS surface controls as the designated surface location. Accordingly, an AMS Operator could perform tasks outside of the building housing the AMS surface controls as long as he or she could promptly respond to audible or visual AMS signals. Other locations may also be used to receive the AMS signals in addition to the designated surface location at the mine, but these locations may not substitute for the surface location at the mine.

Section 75.351(c) provides for minimum operating requirements for an AMS system when it is used to comply with §§ 75.323(d)(1)(ii), 75.340(a)(1)(ii), 75.340(a)(2)(ii), 75.350(b), 75.350(d), or 75.362(f). The AMS must be capable of:

(1) With respect to signals received at the designated surface location: Under most circumstances, MSHA anticipates that, the AMS Operator will primarily respond to audible signals. Visual signals (*e.g.*, a strobe light or colored light on a computer screen) may be used effectively to notify the AMS Operator of the receipt of AMS signals. Sections 75.351(c)(2) and 75.351(c)(3) require that visual alert and visual alarm signals be distinguishable from each other. In addition, audible alert and audible alarm signals must be distinguishable from each other. In order for the mine operator to comply with these provisions, MSHA expects that two distinctive audible signals (*e.g.*, tone, sequence or verbal message) will be generated by the AMS for CO. Likewise, visual signals must be differentiated (*e.g.*, color, code, or sequence).

The operational status of a CO sensor must be identified by the AMS at all times so that if the sensor is not operating, or if a communication interruption has occurred, then a signal should indicate the sensor malfunction. Because many Atmospheric Monitoring Systems monitor various functions, the operational status of CO sensors may not be displayed at all times. However, access to various computer screens must be available to the AMS Operator at all times so that in the event of an alert, alarm, or malfunction, the AMS Operator can identify and properly respond to the signals.

Typical compliance with this provision would be to color-code the status based upon the concentration of CO. For example, a normal CO level would be indicated by green text, an alert level designated by a yellow text, and alarm levels in red text. Either the sensor address, CO concentration or both could be color coded. In the event of two consecutive sensors in alert, the AMS should

provide alarms to the surface location as well as affected areas underground. The designation of the operational status of the sensors can be the alert designation for both of the sensors. These alert and alarm signals must remain functioning until acknowledged by the AMS operator. Once the signal is received by the AMS Operator, the Operator is required to notify appropriate personnel as stated in § 75.352(a).

(2) With respect to signals received at underground locations: Both audible and visual AMS signals must be provided to working sections, setup and removal areas, and other locations specified in § 75.1502. Visual and audible signals must be located so that at least one miner will be able to see or hear a signal at all times in order to notify other affected miners. Audible signals must be of sufficient magnitude to be clearly heard above the sound of machinery or other equipment operating. Visual signals (e.g., strobe lights) may be used effectively to notify miners of the receipt of AMS signals.

If the mine operator monitors for methane under §§ 75.323(d) or 75.362(f), § 75.351(c) (4) requires that the methane alarm be distinguishable from other signals. In order for the mine operator to comply with this provision, MSHA requires that two distinctive audible alarm signals and two distinctive visual alarm signals will be generated at working sections, setup and removal areas, and other locations upon receipt of an alarm signal to differentiate between methane alarms and other alarms. If the mine operator does not monitor for methane under §§ 75.323(d) or 75.362(f), then no distinctive alarm for methane is needed. Once a CO alarm signal is received, then the appropriate actions as specified in § 75.352(c) must be taken. Once a methane alarm signal is received then the appropriate actions as specified in § 75.352(d) and 323(c) must be taken.

Section 75.351(d) contains requirements for the location of AMS sensors. Sensors must be installed in locations where the air currents within the entry are effectively monitored. The sensors need to be installed in the air stream, and not behind obstructions that may reduce the capabilities of the sensors to detect the contaminants being monitored, such as date boards, posts, cribs, and other structures and equipment.

In the case of CO or smoke sensors in the belt entry, sensors should be installed along the belt where miners calibrating and maintaining the sensors will not be exposed to unnecessary hazards associated with the operating belt while performing assigned tasks. Abnormally high areas should be avoided, as well as other locations where airflow patterns do not allow products of combustion to pass over the sensors.

The individual sensors must be placed at a location where they will readily detect products of combustion. MSHA recognizes that sometimes local conditions may require sensors to be located off-center of the entry (e.g., low coal conditions or tailpiece transfer points). Alternate locations proposed by the mine operator should be considered by MSHA inspection personnel when determining compliance. For example, the language found in § 75.351(d)(2) allows for some flexibility in sensor placement. In some instances, sensors may need to be positioned somewhat off-center due to air flow pattern within the belt entry to assure the sensor will be most effective for early warning of a fire, as shown in Figure 5.

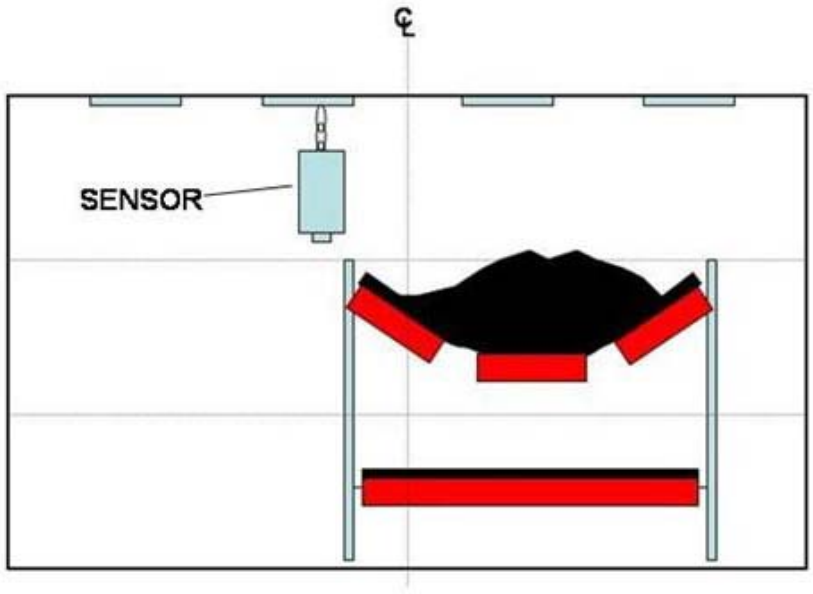


Figure 5

Another consideration is the need to protect miners working on the AMS. Sensors should not be placed in locations where personnel may be exposed to hazards when performing AMS maintenance. If positioning a sensor in the center of the entry exposes miners to hazards, an alternate location should be used to position the sensor to maintain effective fire detection.

Location of CO sensors within the belt air course is set forth in § 75.351(e). Figure 6 illustrates sensor spacing requirements in the belt air course.

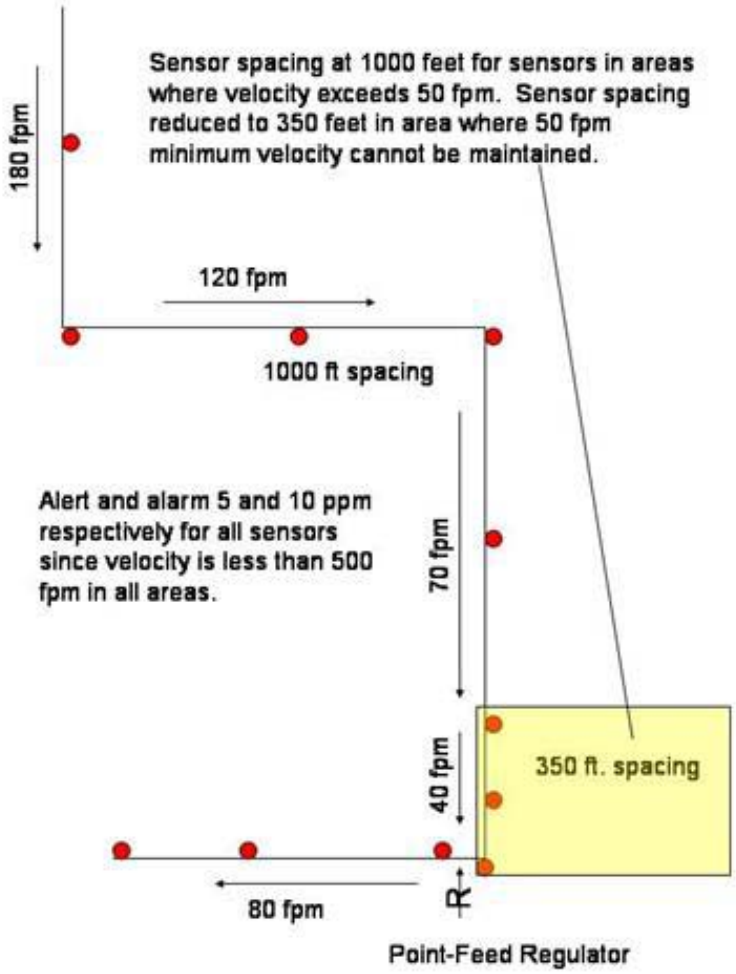


Figure 6

Section 75.351(e)(1) allows for some flexibility in placing the sensor by using the phrase "at or near the tailpiece." MSHA recognizes that there may be clearance issues at the tailpiece loading area and therefore this section allows the sensor to be located immediately outby this area.

As stated in § 75.351(e)(3), if an AMS sensor is used to monitor for carbon monoxide or smoke in the belt air course under § 75.350(b), such sensors must be installed "[a]t intervals not to exceed 1,000 feet along each belt entry in areas where air velocities are maintained at 50 feet per minute or higher. In areas along each belt entry where air velocities are less than 50 feet per minute, the sensor spacing must not exceed 350 feet."

In general, curtains should not be used in adjacent, common entries to force air into the belt entry. This use of ventilation controls to increase the air velocity in the belt entry may increase air velocity in the belt entry, but will also increase the resistance in the belt air course and decrease the efficiency of the mine's ventilation system. Under these conditions, long-term improvements in the ventilation system should be instituted.

Section 75.351(e)(4) was included to allow a single sensor to be used on the downwind side of a single belt transfer point rather than two sensors -- one each on the upwind and downwind sides of the transfer point, which had been required to identify the belt flight per requirements of § 75.1103.

Section 75.351(f) requires sensors to be installed in the primary (intake) escapeway at two locations when they are used to monitor the primary escapeway under § 75.350(b)(4): within 500 feet of the working sections and setup and removal areas and within 500 feet inby the beginning of the panel. In the event the loading point has been removed or has not yet been installed in setup and removal areas, a sensor would be installed within 500 feet outby the projected or former loading point.

The requirement for a sensor used to monitor the intake escapeway at the beginning of the panel can be fulfilled by a sensor used to monitor a point-feed regulator if the point feed is within 500 feet of the mouth of the panel. Figure 7 illustrates compliance with this provision, by using the point-feed monitoring sensor for both §§ 75.350(d) and 75.351(f). Sensors in the intake escapeway should be placed in a location that will be within the air stream, and not obstructed by any objects. Miners calibrating and maintaining the sensors should not be exposed to any unnecessary hazards.

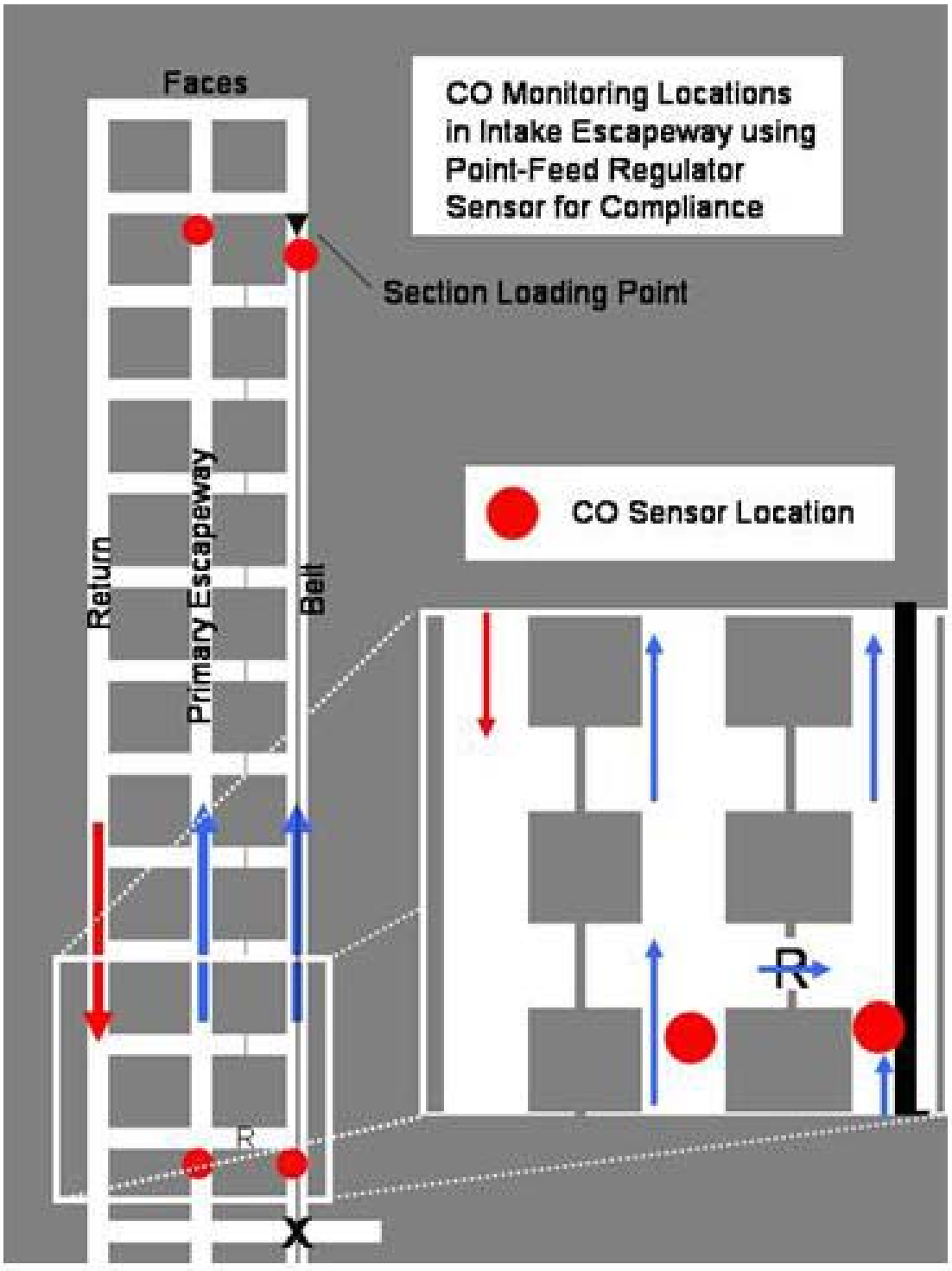
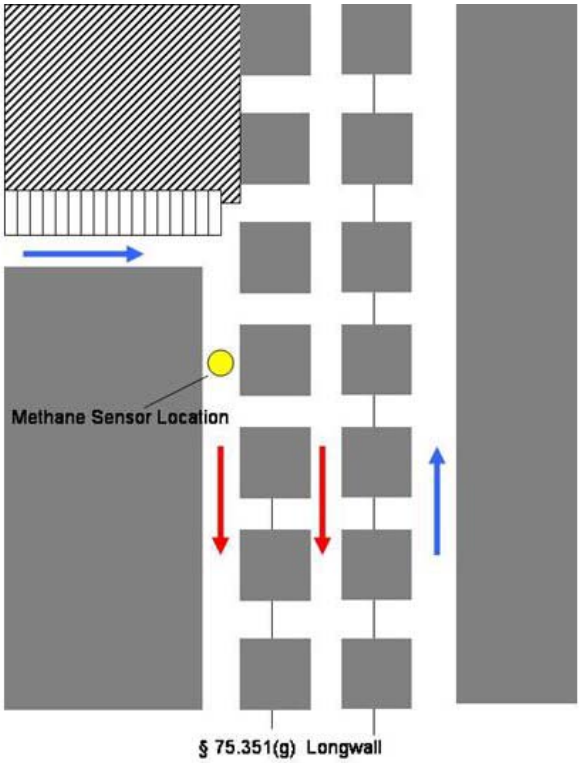
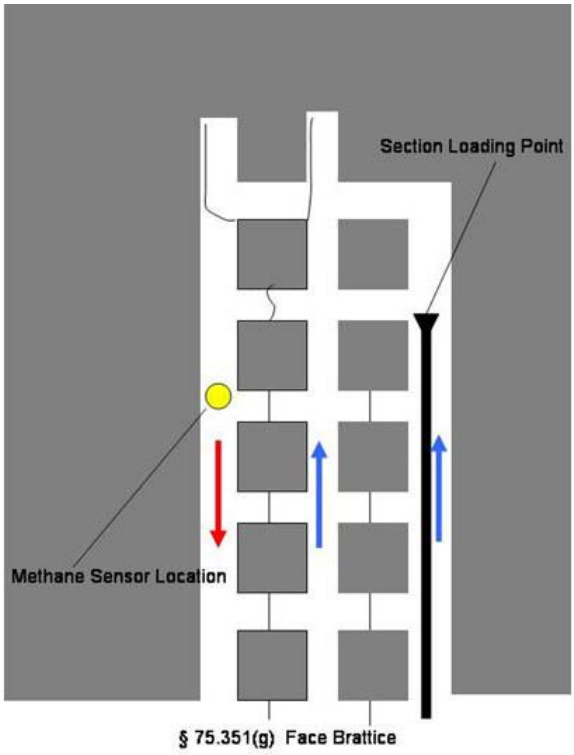

Faces
CO Monitoring Locations in Intake Escapeway using Point-Feed Regulator Sensor for Compliance
Section Loading Point
CO Sensor Location
Return
Primary Escapeway
Belt
R
R
X

Figure 7


Methane Sensor Location
§ 75.351(g) Longwall


Section Loading Point
Methane Sensor Location
§ 75.351(g) Face Brattice

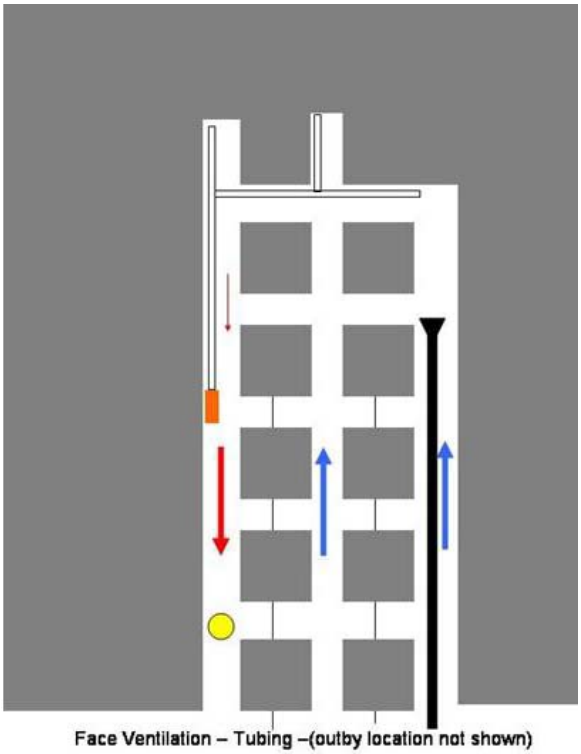

Face Ventilation – Tubing –(outby location not shown)

Figure 8

Section 75.351(g) includes requirements for installing a methane sensor in the return if the sensor is used to comply with §§ 75.323(d)(1)(ii) or 75.362(f). The three examples in Figure 8 show possible locations for methane sensors to comply with § 75.351(g)(2)(i). Other locations have been approved which have been determined to be equally effective, and these locations will continue to be approved.

A second methane sensor is required by § 75.351(g)(2)(ii), at a location just upwind from the location where the return meets another split, or where the return split of air is used to ventilate seals or worked-out areas. MSHA acknowledges that sensor locations may not be practicable when sections are initially developed off of mains or submains.

HOW ARE ELECTRICAL INSTALLATION MONITORED UNDER § 75.351(h)?

This section does not apply to all mines. It only applies to those choosing to use "intake air ventilating underground transformer stations, battery charging stations, substations, rectifiers, or water pumps under § 75.340(a)(1)(ii) or § 75.340(a)(2)(ii). . . ."

Many mines utilizing battery-powered equipment have experienced false alarms for CO sensors due to the presence of hydrogen produced during the charging process. Some operators have implemented a technology capable of accurately measuring CO when hydrogen is present (hydrogen-insensitive sensor). These sensors are calibrated for both hydrogen and CO, and automatically adjust the output based upon the actual concentration of CO. The sensors have been shown to be effective in reducing the incidence of false alarms due to hydrogen interference. The sensors have been evaluated by MSHA, and test results are available from MSHA's Office of Technical Support. The Office of Technical Support can be reached through their webpage at

http://www.msha.gov/TECHSUPP/TECHSUPP.HTM

HOW ARE ALERT AND ALARM LEVELS ESTABLISHED FOR CO UNDER § 75.351(i)?

All alert and alarm levels for CO are set at 5 and 10 ppm, respectively, above the ambient. The MSHA district manager may require reduced levels, depending upon local mine conditions. An example where reduced levels may be warranted is when velocities in the belt entry exceed 500 fpm.

For mines using diesel-discriminating sensors, the alert and alarm levels will be 5 and 10 ppm "corrected CO" above ambient, respectively, unless reduced levels are required by the MSHA district manager to address local mine conditions.

HOW ARE CARBON MONOXIDE AMBIENT LEVELS ESTABLISHED UNDER § 75.351(j)?

Compliance with this requirement has a long history at existing mines. Methods for establishing ambient levels have been specified for many mines through the ventilation plan process. This practice is continued in accordance with this final rule.

Some mine operators may find that diesel-discriminating CO sensors are effective for reducing nuisance alarms due to diesel exhaust, as well as making the AMS more effective for detecting fires early in development. The ambient levels used for these sensors should be the "corrected CO" concentrations and not the actual CO concentrations. Documentation requirements for diesel-discriminating sensors will be the same as for all other sensors.

HOW ARE AMS INSTALLED AND MAINTAINED UNDER § 75.351(k)?

Section 75.351(k) states that "{a]n AMS installed in accordance with §§ 75.323(d)(1)(iii), 75.340(a)(1)(ii), 75.340(a)(2)(ii), 75.350(b), 75.350(d), or 75.362(f) must be installed and maintained by personnel trained in the installation and maintenance of the system." This training can be provided by the mine operator in many cases. In some mines it may be appropriate for the AMS manufacturer to provide initial and periodic training on the system maintenance requirements.

This section also requires the AMS to be "maintained in proper operating condition." This requirement covers every component of the AMS from the sensors to the computer printout paper supply. Systems found to have problems which adversely affect the performance of the system may be cited under this section.

WHAT SENSORS SHOULD BE USED TO COMPLY WITH § 75.351(l)?

Methane, CO, and smoke sensors "must be either of a type listed and installed in accordance with the recommendations of a nationally recognized testing laboratory [such as Underwriters' Laboratories (UL) or Factory Mutual (FM)] approved by the Secretary; or these sensors must be of a type, and installed in a manner approved by the Secretary." New or unique devices that are not yet listed by a NRTL which may meet the requirements of this section must be submitted to the Technical Support Group, MSHA, through the Chief, Division

of Safety, Coal Mine Safety and Health, 1100 Wilson Boulevard, Suite 2400, Arlington, Virginia 22209-2296, for a determination of acceptability.

MSHA has evaluated sensors for intrinsic safety classification under the Mine-Wide Monitoring System Program. As part of this process, since 1995, manufacturers' performance claims have been verified by MSHA's Technical Support group at the Approval and Certification Center. MSHA has determined that these sensors are acceptable for mine use. The Technical Support Group will continue to verify the manufacturers' performance claims of the submitted CO and methane sensors and confirm their accuracy.

HOW ARE TIME DELAYS USED IN § 75.351(m)?

The final rule allows the use of time delays when a demonstrated need exists and when they are specified and approved in the mine ventilation plan. This need should be verified with documentation included in the approved mine ventilation plan. The documentation should include the peak concentrations and duration of excursions above the alert and alarm levels. The operator will be required to show the benefit of the time delay in reducing the number of non-fire related alert and alarm signals. Determination of the length of time delay is dependent upon conditions at the mine. In any case, the maximum time delay allowed is three minutes.

For example, a mine operator finds that diesel exhaust from a certain piece of equipment causes "spike" CO concentrations in the belt entry that then cause alert and alarm signals as equipment travels the mine. The duration of spike concentrations is between 40 and 100 seconds as equipment passes the sensors. A time delay of 101 seconds would eliminate most of these non-fire alert and alarm (nuisance) signals. A delay of shorter duration would eliminate fewer nuisance signals.

Given these data, the district manager can approve the use of an appropriate time delay. The extent of such delays should be limited to the length needed, and should not be implemented in place of proper maintenance of diesel-powered equipment, which can effectively reduce engine emissions of CO. Operators should also consider the advantages of using diesel-discriminating sensor technology. Additional information on alternate sensor technologies is available from MSHA's Office of Technical Support :

http://www.msha.gov/TECHSUPP/TECHSUPP.HTM

HOW SHOULD AMS SENSORS BE EXAMINED, TESTED AND CALIBRATED UNDER § 75.351(n)?

Section 75.351(n)(1) requires that "[a]t least once each shift when belts are operated as part of a production shift, sensors used to detect [CO] or smoke in accordance with §§ 75.350(b), and 75.350(d), and alarms installed in accordance with § 75.350(b) must be visually examined." It is expected that this examination occur during the required preshift (§ 75.360 (b)(2)) or on-shift (§ 75.362(b)) examinations. If a hazardous condition regarding the AMS is found during the preshift or on-shift examinations, a record of the condition must be made as required by §§ 75.360(f) and 75.363. There are no additional recordkeeping requirements contained in § 75.351(n)(1).

Section 75.351 (n)(2) requires that AMS alarms installed in accordance with § 75.350 (b) and (d) must be functionally tested for proper operation at least once every seven days. The method of testing the alarms may vary from operation to operation due to the type of equipment used. The functional test should be conducted by exposing one of the most outby CO sensors to calibration gas so that alarm units at all affected working sections and setup and removal areas are activated by the AMS. These tests could be efficiently completed along with scheduled sensor calibrations. Pursuant to § 75.351(n)(3)(iv), "[i]f the alert or alarm signal will be activated during calibration of sensors, the AMS operator must be notified prior to and upon completion of calibration. The AMS operator must notify miners on affected working sections, [setup and removal areas], or other areas designated in the approved emergency evacuation and firefighting program of instruction (§ 75.1502) when calibration will activate alarms and when calibration is completed." Any other method chosen by the operator must be equally effective for determining if the alarms are operating properly.

Section 75.351(n)(3) requires functional testing of smoke sensors in accordance with the manufacturer's calibration specifications and the calibration of CO and methane sensors in accordance with the manufacturer's calibration specifications at intervals not to exceed 31 days. Section 75.351(n)(4) requires that '[g]ases used for the testing and calibration of AMS sensors must be traceable to the [NIST] reference standard for the specific gas When these reference standards are not available for a specific gas, calibration gases must be traceable to an analytical standard which is prepared using a method traceable to the [NIST]. Calibration gases must be within ± 2.0 percent of the indicated gas concentration." Calibration gases that are prepared using a method traceable to the NIST are also acceptable. For example, gas mixtures that have been prepared gravimetrically using NIST-traceable weights are acceptable for calibration of AMS sensors; blends produced in this method, including disposable (single-use) or refillable (multiple-use) cylinders, are considered traceable and acceptable.

The accuracy statement on the label of a calibration cylinder may give a figure that is higher than ± 2.0 %, as the label accuracy may include both preparation (or 'blend') tolerance and analytical (or 'certification') tolerance. For gases used to calibrate AMS sensors, the analytical tolerance should be 2.0% or less; if the accuracy given on the label is higher than 2.0%, the analytical tolerance should be verified to be 2.0% or less.

WHAT ARE THE RECORDKEEPING REQUIREMENTS OF § 75.351(o)?

We anticipate that many mines will comply with this provision by using a computer printout of malfunction, alert, and alarm signals with hand-written notations. However, other recordkeeping methods are possible. Others may use a hand-written log on a pre-printed form. Some mine operators may use an electronic record, with manually-typed notations on spreadsheet software. An operator may choose to use a single book to record calibrations, and record alert, alarm, and malfunction signals on a separate form at the AMS Operator designated surface location. Whatever the media used, the record should clearly indicate that the requirements of this section are met and that the record is not susceptible to alteration. This record must be kept separately from other records and can be identified as the "AMS log."

A record of hazards identified during the on-shift examination required by § 75.351(n) must be included in the examination book required by § 75.363(b). A separate entry in the AMS log would not be required for these hazards. For example a roof fall knocks down an AMS sensor and the sensor is still functioning. In this instance, a record in the AMS log of the downed sensor would not be necessary, but a record would be necessary of the downed sensor and roof fall in either the on-shift or pre-shift examination book as appropriate.

WHAT IS THE RETENTION PERIOD FOR AMS RECORDS UNDER § 75.351(p)?

The section states that "[r]ecords must be retained for at least one year at a surface location at the mine and made available for inspection by miners and authorized representatives of the Secretary." The one year duration of this recordkeeping requirement is consistent with other similar recordkeeping requirements.

WHAT ARE THE AMS OPERATOR TRAINING REQUIREMENTS UNDER § 75.351(q)?

The AMS Operator must be able to respond quickly to AMS signals that could represent possible mine emergencies. For this reason, proper task training is

critical for the AMS Operator. The appropriate level of training will depend upon the responsibility placed upon the AMS Operator by the mine operator. If the AMS Operator is expected only to relay the occurrence of signals to "appropriate personnel," the level of training will be less than that required if the AMS Operator has additional duties. These duties could include the notification of affected areas underground, assisting in the evacuation of miners, coordination of fire-fighting activities, directing employee transportation, or other tasks. The section further requires that the "record of the content of the training, the person conducting the training, and the date the training was conducted, must be maintained at the mine for at least one year by the mine operator." The one year duration of this recordkeeping requirement is consistent with other recordkeeping requirements of 30 CFR. This record should not be included in the AMS Log or with other AMS records.

WHAT ARE THE COMMUNICATION REQUIREMENTS UNDER § 75.351(r)?

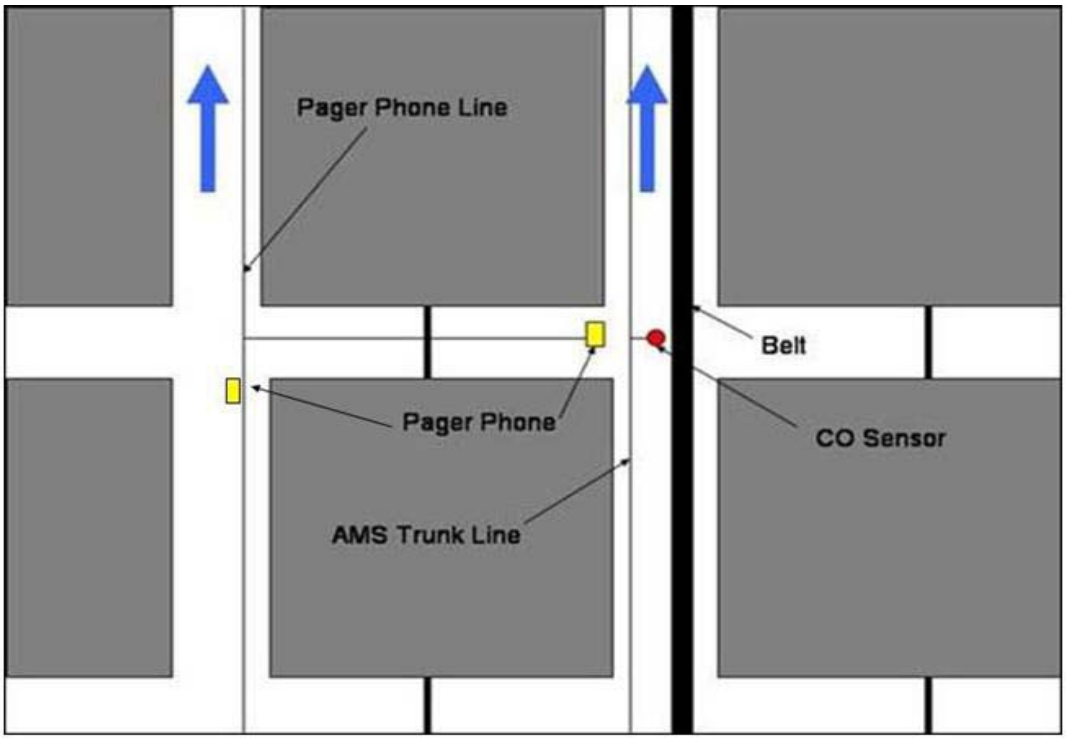


Figure 9

Compliance with this provision can be met by locating the communication (mine pager phone) line in an entry other than the location of the AMS trunk line, if not already installed in this manner. In addition to moving the line, compliance can be achieved by installing a redundant communication line in a different entry to reduce the likelihood that any hazard causing damage to the AMS communication line does not also damage the voice communication line. The

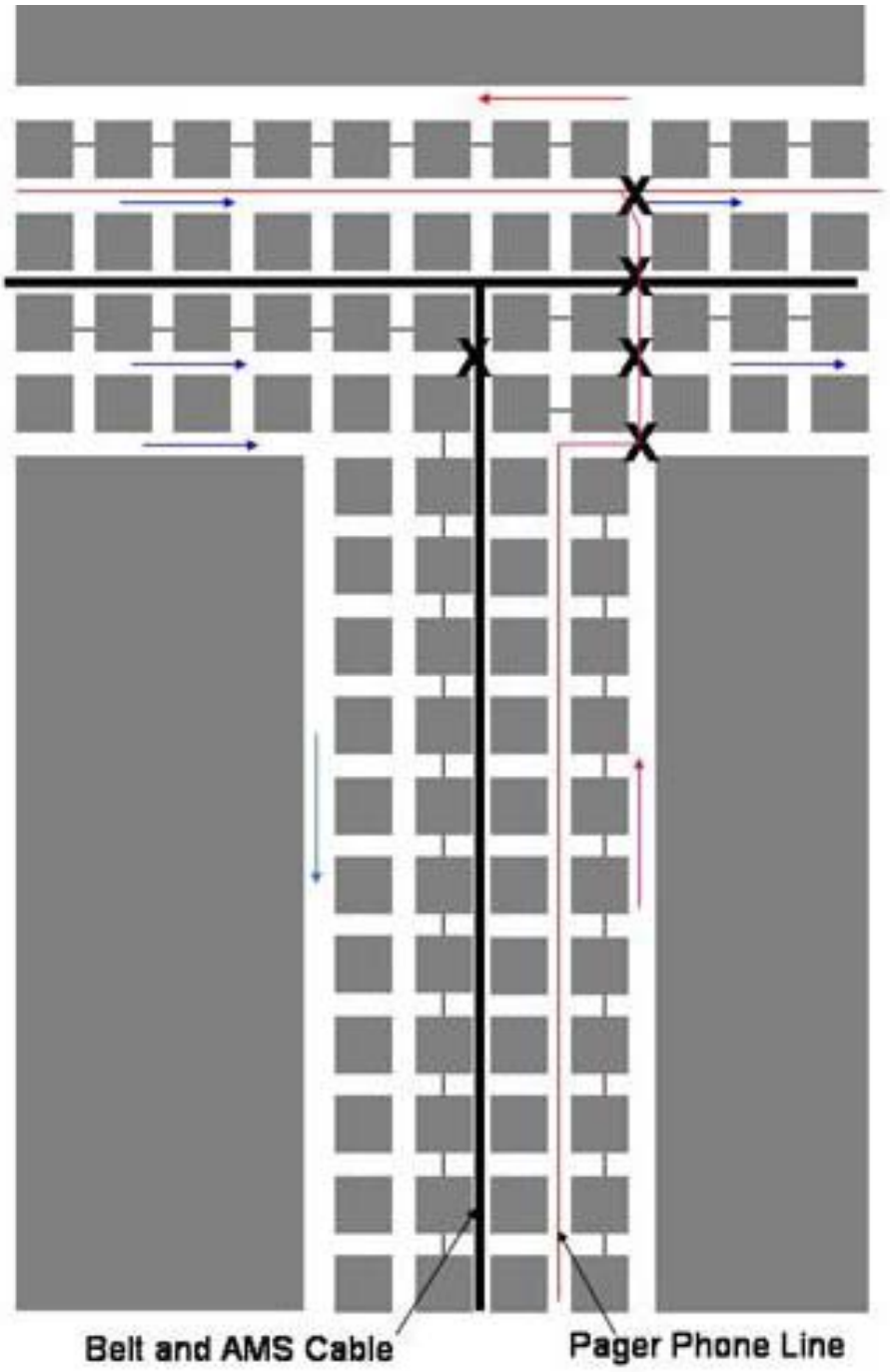


Figure 10

entries may be in the same air course (common entries) or separated by ventilation controls as shown in Figure 9. As the standard states, the sensors required to be installed in the primary escapeway do not preclude installation of the phone communication line in the primary escapeway.

In the event the pager phone line crosses the belt entry to provide service to a working section, the communication line should be installed in a manner consistent with Figure 10.

If an alternate means of communication is available, the phone cable can be contained in the same entry as the AMS cable. As shown, the phone cable can be installed across overcasts which provide separation of the entries to comply with the provision. However, in some cases where no overcasts are available, other means of protecting the communication line could include installation in a protective conduit.

WHAT ACTIONS SHOULD BE TAKEN IN RESPONSE TO AMS SIGNALS UNDER § 75.352?

Responses to signals produced by the AMS will typically be initiated by the AMS Operator or by appropriate personnel after being notified of the signal by the AMS operator. In any case, the AMS operator must immediately respond to AMS signals indicating a malfunction, alert, or alarm for carbon monoxide or methane, or alarm signals for smoke sensors by notifying appropriate personnel. In addition, when an alarm signal from a CO or smoke sensor or two consecutive alert signals are received for CO, the AMS Operator must notify appropriate personnel, which may include the responsible person under § 75.1501. In this situation, the responsible person is considered an appropriate person under this rule. Please note that other individuals may also be considered appropriate personnel when an alarm signal from a CO or smoke sensor or two consecutive alert signals are received for CO. There is no requirement for consecutive smoke sensors in alert, because smoke sensors provide only an alarm signal.

This section requires that when a CO sensor alarm occurs, including two consecutive CO sensors in alert, affected underground personnel must be withdrawn to a "safe location" as identified in the program of instruction required under § 75.1502. Historically, this location has been located in the intake escapeway at a location upwind of the alarming sensor which would not be exposed to products of combustion. In some cases, depending on the location of the alarming sensor, the safe location may require evacuation to the surface.

Actions must be appropriate for the type of signal received. While this compliance guide cannot describe all possible signals and responses, a number of examples are provided for guidance.

Example 1.

An AMS Operator receives a signal that indicates a sensor is not communicating with the AMS computer. The AMS Operator notifies the mine foreman, who sends a maintenance person to check on the cause of the signal and discovers a non-functioning sensor. In addition, because the sensor is not functioning, according to § 75.352(e)(1), continued operation of the belt will require monitoring at the affected sensor location using a handheld detector until the sensor is repaired. A record must be made in the AMS Log that a communication failure signal was received, including the date, time, extent, cause of the malfunction, and what corrective actions were taken.

Section 75.352(e)(6) requires that handheld detectors used to monitor under § 75.352(e)(1) must have a detection level equal to that required of the AMS sensors in § 75.351(l). There are commercially-available detectors to monitor for both CO and methane. For smoke detectors it has been determined by researchers that a 5 ppm CO level is equivalent to a smoke sensor alarm.

Example 2.

If more than one sensor is inoperative, or if the entire system fails, operation of the belt can continue if the sensor locations are properly monitored as shown in Figure 11.

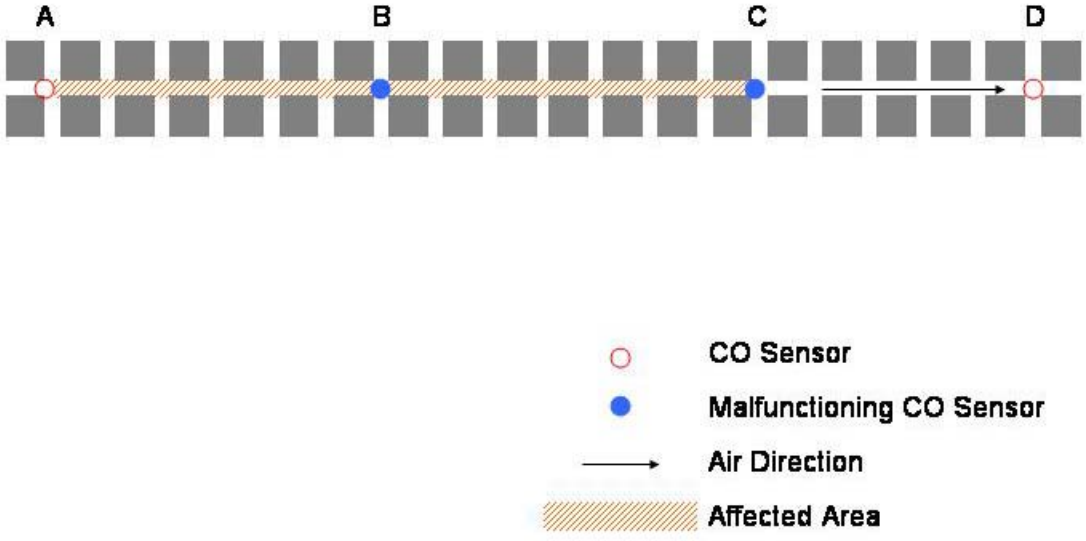


Figure 11

This can be accomplished in a number of ways. First, a person can be stationed at each malfunctioning sensor location with a hand-held detector, continually monitoring. In addition, each person must provide hourly readings to the AMS operator. Second, another method of monitoring the AMS would be a person traveling the affected area as long as the entire area (Point A to C) is traveled within one hour. Third, a team of persons may patrol the affected area, each departing from the same point at one hour increments. In this case the area is traveled each hour by a different person, each complying with the monitoring and communications requirements of this rule.

The people assigned to monitor or patrol the belt must remain in the belt entry continually. They must be trained in the use of handheld gas detectors, as well as the proper response to detector readings. Any alert or alarm level detected must be reported immediately to the AMS Operator, who in turn will take the necessary steps to respond. In addition, if no alert and alarm levels are detected,

the people assigned to monitor the belt air course must report to the AMS Operator that "all clear" conditions exist at intervals not to exceed one hour. Finally, a record must be made in the AMS Log regarding the inoperative sensors, including the date, time, extent, cause of the inoperative sensors, and what corrective actions were taken.

Example 3.

An AMS Operator receives signals that indicate that communication with CO sensors connected to a single outstation is lost. The AMS Operator notifies the mine foreman, who sends a maintenance person to check on the cause of the signals. In addition, according to § 75.352(e)(2), continued operation of the belt will require monitoring at each affected sensor location using a handheld detector until the repairs on the outstation are completed. As an alternative to positioning a trained person to hand monitor at each sensor location, the area may be patrolled in its entirety within one hour. A record must be made in the AMS Log that communication failure signals were received, including the date, time, extent, cause of the malfunction, and what corrective actions were taken.

Example 4.

An AMS Operator receives an alert signal from a CO sensor on a development unit which uses belt air to ventilate the working section. The AMS Operator immediately calls the section foreman to have the source of the alert signal investigated. The section foreman finds a hot roller on the belt causing low levels of CO to be produced. The section foreman then directs repairs to be made

by appropriate personnel. Repairs are made to the roller and the CO levels return to normal. A record must be made in the AMS Log of the high CO level signal was received, including the date, time, extent, cause of the high CO level, and what corrective actions were taken.

Example 5.

An AMS Operator receives an alert signal from a CO sensor on a development unit which uses belt air to ventilate the working section. The AMS Operator immediately calls the section foreman to have the source of the alert signal investigated. While the section foreman is investigating the source, a second consecutive sensor indicates alert and the first sensor remains in alert. Accordingly, the two consecutive alerting sensors are treated as an alarming sensor under § 75.352(c). The AMS Operator must now notify the appropriate personnel of the alerting sensors as well as inform them that an investigation of the initial alerting sensor is underway.

At this point the evacuation of miners in affected working sections and setup and removal areas, unless assigned other duties under § 75.1502, must be initiated and the program requirements of § 75.1502 must be implemented. A record must be made in the AMS Log that includes the date, times, location of the CO sensors, and cause of the alert signals, and what corrective actions were taken.

Example 6.

An AMS Operator receives a signal indicating an alarm on a methane sensor located in the return of a development unit which is used to comply with the return split alternative under § 75.323. The AMS Operator notifies the mine foreman who in turn calls the working section to assure the section alarm has sounded and that actions referenced under § 75.323 are taken. A record must be made in the AMS Log that includes the date, times, location and cause of the alarming sensor signal, and what corrective actions were taken. This example is also applicable to a retreating unit.

Example 7.

An AMS Operator receives a signal indicating an alarm on a CO sensor on a panel where belt air is used to ventilate the section. Affected areas are required to receive automatic alarm signals under § 75.351(c)(4). In addition, under § 75.352(c), the appropriate person must notify the affected areas and miners, unless assigned other duties under § 75.1502, must be withdrawn to a safe location identified in the mine emergency evacuation and firefighting program of

instruction. Similar actions must be taken if two consecutive CO sensors indicate alert levels of CO have been detected.

WHAT ITEMS WILL BE CHANGED TO THE VENTILATION PLAN IN LIGHT OF § 75.371?

A number of requirements from the final rule are subject to approval in the mine ventilation plan. Section 75.371(ii) requires the locations (designated areas) be included in the ventilation plan, where respirable dust measurements would be made in the belt entry when belt air is used to ventilate working sections or setup and removal areas as required in § 75.350(b)(3). The sampling location indicated on Figure 12 complies with the requirement. The designated area (DA) is positioned immediately outby the section loading point. While the concentration of dust inby the feeder will most certainly be no less than that of this location, the outby location would comply with the provision because it is measuring the dust contribution of the belt air being coursed onto the working section. Typically, for those working sections that do not use belt air for ventilation, the loading point is located inby the check curtain across the belt entry which isolates the belt. Any dust produced inby the check curtain contributes to exposures to miners on working sections. In most mines that choose to use belt air, the respirable dust produced at the loading point will be diluted. Occupational exposures on working sections are subject to respirable dust standards of part 70.

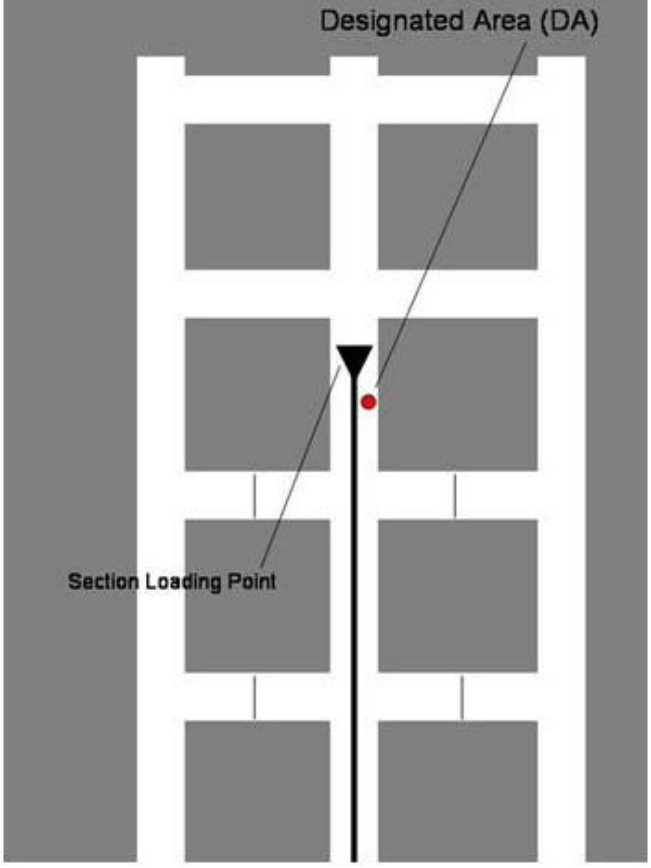


Figure 12

Section 75.371(jj) has been added due to velocity issues included in § 75.350(a)(2). One way to comply with the requirement is to designate locations where higher velocities are maintained in the ventilation plan and include these locations on the ventilation map as required by § 75.372(a)(2), or on an alternate sketch. The map or sketch should indicate the areas where the velocity exceeds 500 fpm and indicate the maximum in that area. Compliance with the requirement could also be met by describing the locations in the text portion of the mine ventilation plan, including the maximum velocities proposed for these areas.

Compliance with § 75.371(kk) can be accomplished by including in the mine ventilation plan and on the mine ventilation map or sketch, locations where the air quantity will be measured to comply with this section. As the air quantity will vary between the intake air course and belt air course due to leakage, we do not expect the location to be immediately outby a point-feed regulator located near the mouth of a panel. Such a determination defeats the protection provided by the requirement intended to limit the potential for contamination of the intake escapeway in case of a fire in the belt entry. Figure 13 depicts reasonable locations for making this determination.

This location is subject to approval in the ventilation plan. An alternate method to describe, in text, this location would be "10 crosscuts outby the nearest face" or, perhaps, "midway between the section loading point and the intersection of

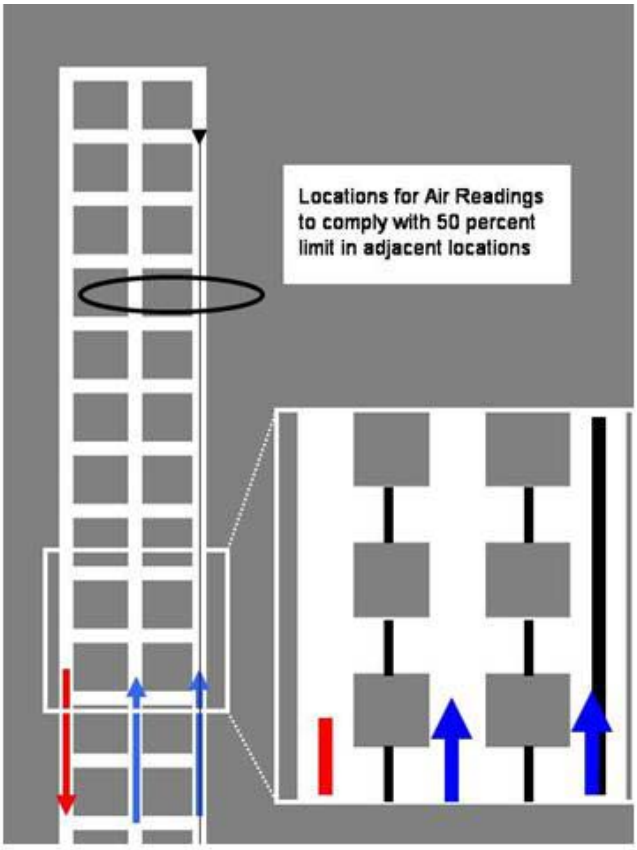


Figure 13

the panel belt with the mains." In this example, the measuring location will advance as the section advances.

The mine map or sketch can again be effectively used to identify the locations of point-feed regulators as required by § 75.350(d)(5), as well as any additional sensors required by the district manager in accordance with § 75.351(e)(5).

The three remaining requirements of this section cannot be included as part of the ventilation map or sketch, and must be included for approval in the ventilation plan. If the operator finds a need to implement a time delay, or wishes to use some other method to reduce non-fire related alert and alarm signals, the method must be approved in the mine ventilation plan according to § 75.371(nn). In the case of time delays, the district manager can approve up to a three-minute time delay, if the mine operator demonstrates a need for the delays as discussed in § 75.351(m). As previously discussed, the operator must provide data and data analysis of the non-fire related alert and alarm signals, the duration of the signals, and the suspected cause of the signals, as well as the expected benefit of instituting a time delay.

In the case of air velocities in the belt entry exceeding 500 fpm, MSHA district managers, when necessary to assure the effectiveness of the monitoring system, may require reduced alert and alarm levels for sensors within these areas, according to § 75.371(oo). The reduced alert and alarm levels for these sensors must be included in the mine ventilation plan as required by § 75.351(i)(2).

If a partial or total AMS malfunction occurs, the operation of the belt may not continue until the system is repaired, or actions are taken to institute monitoring or patrolling the belt until repairs and corrections are made as allowed in (§ 75.352(e)), as approved according to § 75.371(pp). A similar provision is allowed in cases where the minimum velocity is not being maintained (§ 75.352(f)). When monitoring or patrolling affected areas, trained persons are required to use handheld detectors with a detection level equivalent to that required of the sensors in § 75.351(l) .

Some mine operators may use fire detection sensors other than CO sensors. If similar-type handheld detectors are not available, the operator will need to specify use of a CO detector or other instrument, with alert and alarm levels also specified, in the mine ventilation plan. For example, smoke sensors may become commercially available to be used for fire detection. Handheld smoke detectors may not be commercially available to be used for monitoring in case of sensor or system failure. To comply with this provision, the operator would be expected to submit ventilation plan language stating similarly "The alternate instrument to be used for compliance with § 75.352(e) and § 75.352(f) is a CO detector. The alert and alarm levels are 5 and 10 ppm, respectively."

WHAT ITEMS NEED TO BE CHANGED IN THE MINE VENTILATION MAP IN LIGHT OF § 75.372(b)(16)?

This part has been modified to make clear that the locations required on the mine map are those of sensors which are required by subpart D. Any sensors installed that are not required by a standard do not need to be shown on the map. For example, if an operator uses the AMS to monitor air velocity at a bleeder evaluation point, and it is not used to comply with any standard in subpart D, it does not have to be shown on the map. All permanent ventilation controls are required to be shown on the ventilation map according to § 75.372(b)(12).

WHAT ESCAPEWAY REQUIREMENTS ARE THERE IN § 75.380?

To comply with § 75.380(n), the mine operator may construct a lifeline which meets the requirements of the section, or may purchase a pre-fabricated lifeline from a vendor that meets the requirements of this section. Pre-fabricated

products are available in spools of 300- and 1000- foot lengths made of durable material containing directional cones.

Figure 14 shows how miners use directional cones for indicating proper direction for evacuation. As miners slide their hands along the lifeline, they will encounter the cones. If the proper direction is being followed, the hands will slide over the cone. If the direction is not correct, miners will experience the flat end of the cone, and will need to reverse direction. Other directional indicators of equal effectiveness are acceptable.

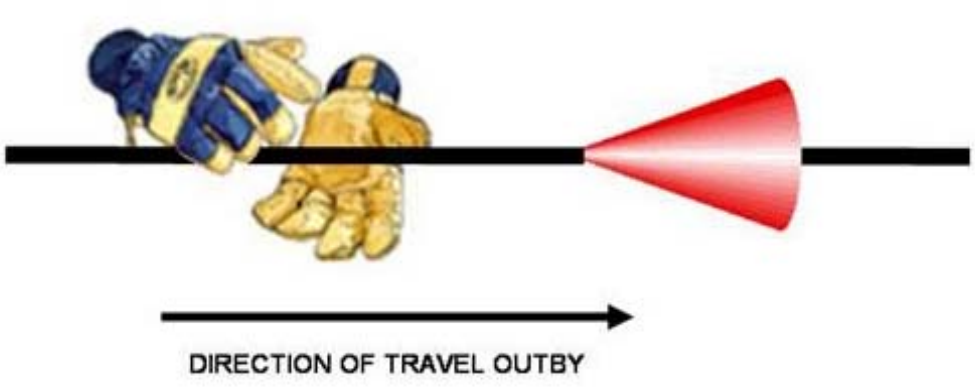


Figure 14

Installation of lifelines is required only in return air courses designated as an alternate escapeway, or portions of the return used as part of the alternate escapeway. If an alternate escapeway utilizes any portion of a return air course, even for only a short distance, and utilizes other intake entries for the remainder of the escapeway, all of the portions of the alternate escapeway coursing through the return air course must be equipped with a lifeline. Intake or belt entries used as portions of an alternate escapeway are not required to be equipped with directional lifelines.

Questions/Answers from the Field

1. How are two-entry petitions affected by this final rule?

The rule applies only to areas where three or more entries are developed. In two-entry mining systems, multiple entries are developed for mains and sub-mains. Mine operators must comply with this final rule in order to use belt air

for these three or more entry development areas. In addition, if air from the outby belt entry which is developed with three or more entries is used to ventilate a two-entry working section, the belts must be monitored for smoke or CO as required by this rule in the area outby the two-entry system. In areas of mines where only two entries are developed under petition, the final rule does not apply, and the mine operator must meet the requirements of the granted petition(s) for modification.

2. Will the lifeline requirement for alternate escapeways that are in a return entry be required in a two-entry section which is governed by a separate petition for modification?

Two-entry sections are governed by the requirements in granted two-entry petitions. Any lifeline requirements in these two-entry systems would be contained in such granted petitions.

3. To increase the air velocity in the belt entry, can an operator install check curtains in adjacent common entries to force air into the belt entry?

Ventilation controls such as these should not be used unless they are needed to mitigate methane accumulations. Reduced sensor spacing of not more than 350 feet can be considered by the operator in areas where 50 fpm air velocities cannot be maintained in the belt entry.

4. Is providing air to belt air courses from a shaft, slope or drift opening considered point feeding and therefore subject to requirements in §§ 75.350(c) and 75.350(d)?

No. This issue was addressed in the preamble of the 1992 ventilation rule. It is considered an accepted practice (57 FR 20905, § 75.380(h)) and is not considered point feeding for the purposes of this rule.

5. What happened to the former § 75.352?

The requirements are retained in the final rule under § 75.350(b).

6. If electrical installations are vented to the belt entry, are these regulators considered point feeds?

No, not under normal circumstances, because the intake air at the electrical installation is not being used to add intake air to the belt air course. The purpose of this additional air is to ventilate the electrical installation.

7. What is a disabled/inoperable belt?

A belt that is incapable of being operated. If a belt drive is not operable, or the belt material is broken, the belt flight is not operable. If installation of a belt flight is completed, and power is locked out/tagged out, the belt is considered inoperable until the lock/tag is removed. If a belt can be operated at merely the flip of a switch, the belt is considered operable.

8. If a mine is not in production for a period of time, such as miners' vacation, must the examination and testing requirements be continued throughout this period?

Examinations for compliance with § 75.350 should not be required if the belt is disabled or is inoperable. However, if personnel are underground and the AMS is used to comply with §§ 75.323(d)(1)(ii), 75.340(a)(1)(ii), 75.340(a)(2)(ii), 75.350(b), 75.350(d), or 75.362(f) examinations must be completed in accordance with applicable standard(s).

9. If a mine is shut down for a three month period, must the calibration of sensors be continued throughout the period?

If no belts are being operated, the calibrations may be suspended for sensors installed to comply with the requirements to use belt air on working sections and areas where equipment is being installed or removed. Prior to resumption of mining, all sensors must be properly calibrated, all functional tests must be completed, and examination of the system on the shift mining resumes.

10. What is a functional test?

A functional test of alarms should include application of a known carbon monoxide concentration to a CO sensor which will produce alarm signals for all areas using belt air as provided by this final rule. A simple way to comply with this provision is to install a sensor at a central location, perhaps on the surface, which is programmed to activate all alarm signals when sufficient CO is applied. The test can be scheduled in advance, or announced to affected areas just prior to the functional test to avoid unnecessary evacuation of the affected areas. An alternative would be to apply CO to a sensor on each section. Combining the functional tests with required sensor calibrations is also permitted.

11. Can the functional test be made from the computer at the AMS surface location?

The alarms can be checked by applying a sufficient concentration of gas to a sensor installed on the surface if it is programmed to activate all alarms in affected areas of the mine. Activation by use of the computer without application of the gas, if possible to do so, is not considered a functional test.

12. What does MSHA consider to be a cause of an alert or alarm signal known not to be a hazard to miners?

If a sensor is being calibrated, and an alarm signal is produced as a result, then the cause is known and no action is required to implement evacuation. Similarly, if in investigating an alert signal a mine foreman determines the source to be non-fire related, and a subsequent alarm occurs, evacuation may not be required. The key to initiating evacuation is determining if the signals are caused by an event known not to be a hazard to miners.

13. What is a Nationally Recognized Testing Laboratory (NRTL)?

A NRTL is an organization that OSHA has "recognized" as meeting the legal requirements in 29 CFR 1910.7. A list of NRTLs can be found at http://www.osha.gov/dts/otpca/nrtl/index.html .

14. Can an operator install a door at point-feed regulator locations, such as a garage door, to facilitate a required closure of the point-feed regulator?

Yes, an alternate method of separating the air courses is acceptable, as long as the structures and materials used meet the requirements of permanent ventilation controls of § 75.333 and the remote closure requirements are met. A brattice check would not be adequate for this purpose, while a substantial overhead garage door would be acceptable.

15. Is the AMS an electrical installation?

Although the AMS is connected electrically, the AMS is not an electrical installation as defined by § 75.340.

16. Must electrical installations in common entries be monitored for smoke or CO?

Yes, if electrical installations, as defined by § 75.340, are in common entries with the belt entry, and belt air is used to ventilate the working section or setup and

removal areas, they must be monitored unless they are ventilated with air coursed to the return.

17. When making air readings to determine the 50 percent contribution of belt air to the section, can readings be taken in the intake and return and the balance be calculated as the belt air course contribution?

Yes. Because taking air readings in the belt entry are difficult, as long as the difference between the air readings represents the belt air course quantity and the locations are approved in the ventilation plan, this would be acceptable.

18. Can centerline air velocities be used to measure belt entry air velocity?

MSHA inspectors will use vane anemometer traverses and timed-smoke tube measurements to determine the average belt entry air velocity for compliance determinations. Center-line measurements are considered less accurate, and will not be used for compliance purposes. However, MSHA can use center-line measurements for screening purposes, and mine operators may utilize center-line measurements for any purpose they find to be of value.

19. What is a correction factor for making center-line velocity measurements to convert to average velocity?

While less accurate than traverse measurements, an average velocity is traditionally 80 percent of the maximum center-line velocity in an airway. Because the belt and structure are installed within the belt entry, the use of centerline measurements is less accurate than traversing the entry.

20. Must each location where the velocity may exceed 500 fpm be specified and approved in the ventilation plan on an individual basis, or will a statement such as, "Air velocity in the belt air course in the first four sensors in the east mains belt line may exceed 500 fpm, but in no case shall the velocity exceed 750 fpm, in areas where the entry area is reduced due to ventilation controls and/or roof support installation" be adequate?

Statements such as this may be included in the ventilation plan; however, areas with velocities in excess of 500 fpm may be required to utilize alert and alarm levels less than the 5 and 10 ppm, respectively, as specified in the rule for velocities up to 500 fpm. Each sensor location where the velocity exceeds 500 fpm must be specified and approved in the ventilation plan.

21. Is there a limit on air velocities in the primary escapeway?

There are no limitations on the velocities in the primary escapeway.

22. Will all miners have to be trained in the basic operating principles of the AMS, including required actions, or, particularly at mines that currently use belt air for face ventilation?

Mine operators should update training plans to include required training on the operation of the AMS, and provide applicable training to miners promptly, as required by § 75.350(b)(2).

23. The final rule does not have specific training program requirements. What subjects should be included?

For AMS Operators, as required by § 75.351(q), training should include, at a minimum, identification of appropriate personnel, identifying affected areas, ventilation system design and function, communications requirements, actions for malfunction, alert, and alarm signals, and any other mine-specific requirements. Miners should be trained, according to § 75.350(b)(2), on responses to signals and evacuation. If point feeding is used, training on closure of point-feed regulators should be provided.

24. If an approved point-feed regulator is closed (not currently in use), does it need to be monitored with CO or smoke sensors and an additional remote closing door?

An additional door is not required. Sensors must be installed as prescribed if the regulator is opened. If sensors are not installed and excessive leakage or an opening exists in the regulator, the mine would be cited for a violation of § 75.350 since separation between the air courses is not maintained.

25. Can a general statement, such as "One or more of the approved point-feed regulators may be closed and, if closed, the installation will no longer be considered a point-feed regulator and will not have to comply with the requirements for point-feed regulators", be approved in the ventilation plan regarding closed point-feed regulators?

While this can be approved in the ventilation plan, if the requirements for monitoring, etc., are not in place and excessive leakage or an opening exists in the regulator, the mine would be cited for a violation of § 75.350 since separation between the air courses is not maintained.

26. A mine point feeds air at a location inside the mine. Must the belt flights, which are outby the point-feed location and not affected by the point feed, comply with the belt air regulations?

If air from a belt air course is used to ventilate working section(s) or setup and removal areas, the air must be monitored for smoke or CO as required by the final rule. If air is directed in an outby direction, the MSHA district manager may require additional sensors to be installed in some areas, which will be determined as part of the mine ventilation plan approval.

27. A belt and track are common and then later separated. Is the air in the track considered belt air?

Yes. The air passes over a belt and is, by definition, belt air.

28. In the above example, if air is added from the track to the belt through a regulator, is this considered point-feeding, and do the requirements of this rule apply?

A determination must be made by MSHA enforcement personnel, and may depend upon escapeway designations. This will be determined on a mine-by-mine basis.

29. Because lifelines are not currently required, there may be a shortage of pre-fabricated lifelines available. In the event of a supply shortage, will purchase orders prevent a citation if due diligence is shown?

No. Purchase orders of products will not prevent a citation. However, MSHA will consider product availability when abating citations issued under this section. If an order is placed and cancelled merely to indicate attempted compliance, MSHA will consider this a willful violation of the regulation if it is determined the order has been cancelled and the purchase order is being used as evidence of due diligence.

30. What constitutes reflective material on the lifeline at 25-foot intervals?

We anticipate that a reflector would be hung on the lifeline at the 25-foot intervals, or a piece of reflective tape could be wrapped on the line at 25-foot intervals. A tape width of approximately 2 inches would be acceptable.

31. A lifeline is installed in a return entry starting at the working section. This alternate escapeway transfers from the return to the belt (discontinuation of lifeline) then at a point outby it transfers back into the return. Will a

lifeline be required where the alternate escapeway re-enters the return or just be required from the working section to where the escapeway first leaves the return entry?

Lifelines are required to be maintained in any portion of the return entries used as part of the designated alternate escapeway. The lifeline would be required to be installed at the location where the alternate escapeway re-enters the return and for the remaining extent of the alternate escapeway within the return air course.

32. For § 75.351(o)(2), how can an operator comply with the signature requirement, if records are kept electronically?

If an electronic record is kept, a method to secure the records to prevent any unauthorized alterations must be used. This can be annotating the file, identifying the user by a log-in identification, or equally effective means to identify the user in a "write once – read many" file.

33. Do the results of monitoring while repairs to the AMS are being made in case of malfunctions need to be recorded?

The AMS Operator must be contacted immediately if the CO concentration reaches the alert and alarm levels. These notifications must be recorded as an alert or alarm in the AMS log. No record of the hourly report of contaminants (CO and smoke) levels less than the alert and alarm levels need be made in the AMS log book.

34. If a mine used belt air in only a portion of the mine, do all belts need to be equipped with CO and smoke sensors?

No. Point-type heat sensor systems may be used on any belts ventilated with air that is directed to a return or to the surface, and is not used to ventilate working sections or setup and removal areas. If AMS components are used in these belts in lieu of point-type heat sensors, they must be installed in compliance with § 75.1103.

35. If a sensor is installed within 50 feet of the point-feed regulator, can this sensor also be used to satisfy the requirement for monitoring the primary escapeway within 500 feet of the working section or setup and removal areas, according to § 75.351(f), if this sensor is within 500 feet of the loading point?

Yes. A single sensor installation can possibly meet the requirements of more than one standard. This is especially true for the point-feed sensor at the mouth of the panel, and also for some mines point-feeding nearer to the section loading point.

36. Where is the sensor in the primary escapeway required to be installed within 500 feet of the mouth of a panel in a mains development section?

Because there is no panel mouth, there is no sensor required for this location on the mains. However, working sections in main entry development are required to have a sensor installed within 500 feet of the working section loading point in the primary escapeway.

37. What is considered to be the beginning of a panel?

The panel begins at the point where the working section turns off of the mains or submains.

38. Will a velocity in excess of allowable limits be cited at reduced entry area locations such as at overcasts?

Compliance determinations may be made at locations where entry dimensions are typical for that area of the mine. Unusually high and low areas should not be used for velocity determinations, such as bunker areas or overcasts.

39. Are temporary regulators, which are installed outby and near the section loading point and are advanced as the section advances, considered to be point-feed regulators subject to the requirements of § 75.350(d), including the one for remotely closing doors?

If the purpose of the regulator is to supply air to the loading point area to reduce dust or diesel emissions and control methane liberation, this regulator is not a point-feed regulator for the purposes of this rule. The intent of this rule is not to restrict needed ventilation distribution in the loading point area or crosscuts recently opened. If the regulator is moved regularly with the section, the requirements would depend upon the proximity of the regulator to the section. It should be determined in the ventilation plan approval whether to require monitoring and closing doors on a mine-by-mine basis.

40. What are the requirements for point feeding if belt air is not used to ventilate working sections and setup and removal areas?

Section 75.350(c) requires the location and use of these point feeds be approved in the mine's ventilation plan. Additional requirements, such as the remote closing door, sensors, and velocity limits, would be considered in the ventilation approval process on a mine-by-mine basis. The MSHA enforcement district office should be contacted for additional information.

41. Are radios (leaky feeder systems) acceptable as a means for providing communication under § 75.352(e)(4)?

Yes. Any dependable communication system can be used.

42. What does "location of additional CO or smoke sensors" mean under § 75.371(mm)?

This phrase refers to sensors required by the MSHA district manager for locations other than those explicitly required by the final rule. (See page 11 of this guide for an example).

43. The belt air standard in § 75.351(b)(4) asked for the names of designated AMS operators. In the Mine Emergency Evacuation and Fire Fighting standards, mine operators were allowed to list an occupation in lieu of a name(s). Will this interpretation be used for the belt air regulation?

Listing an occupation rather than a name would be allowed only for the responsible person. A list of names of AMS Operators would need to be posted at the designated surface location. Appropriate personnel could be designated by title. For example, for malfunctions of AMS components, the appropriate person could be designated as the maintenance foreman on duty. For an alert or alarm CO signal, the appropriate person could be the mine foreman on duty.

44. For surface signaling devices, is it sufficient to have a common audible tone for CO and methane alarms while providing distinguishable visual signals?

Yes. As long as the AMS Operator is trained to immediately respond to all audible signals in an appropriate manner, the intent of this requirement could be met by a single audible tone for these alarm signals, while CO and methane would have unique visual alarm signals at the designated surface location.

45. For underground signaling devices, is it sufficient to have a common audible tone for all alarms (CO or smoke, and methane) while providing distinguishable visual signals?

No. As required by § 75.351(c)(4) audible CO alarms must be distinguishable from methane alarms.

46. Can a mine operator install two alarm units on a section to provide differentiated alarms for methane and CO?

Yes. If two units are programmed to indicate alarms for the different signals, are physically separated, and miners are trained on the required response and maintenance of the alarm units, installation of two units would comply with this requirement.

47. Must the visual examinations of the AMS required by § 75.351(n)(1) be conducted by a Certified Person?

No, a certified person need not conduct this examination. However, MSHA expects most mine operators use a certified person to conduct the required visual examination during the preshift or on-shift examinations.

48. Must an AMS Operator be a Qualified or Certified person?

No. The AMS Operator must be properly trained to perform the duties required by this rule.

49. Can a mine operator point feed air from the primary escapeway to the belt air course if it is the designated alternate escapeway?

Yes, with approval by the MSHA district manager.

50. What type of material can be used as a lifeline in alternate escapeways?

The lifeline must be constructed of a material that will provide a user adequate grasp without breaking, with supports to sustain forces exerted by escaping miners. We would anticipate that nylon rope with directional indicators would comply with the provision. A light-duty nylon twine or similar material would not be acceptable, as it would not be able to hold up under the conditions of use.

51. What type of records should be made for the examination of the AMS required by 75.351(n)?

Hazardous conditions found by a certified person conducting preshift or on-shift examinations of the belt entry during which the visual examination of the CO sensors must be recorded. Examples include improper sensor location, damaged AMS components, inadequate air velocity or reversal of air direction in the air course, fallen or misplaced sensors and inoperative AMS components.

52. Are there any restrictions on the color of the lifeline used in the alternate escapeway?

No. MSHA does not have restrictions on the color of lifelines. However, some states do have escapeway marking requirements different from MSHA's requirements.

53. An alarm signal is received on a working section and by the AMS Operator at the designated surface location. Shortly after evacuation from the section is ordered, the alarm signals stop. Does the crew still need to evacuate the section to a safe location?

Yes. Because the cause of the alarm signal is unknown, the alarm must be considered early warning of a fire, and evacuation must continue. If on the way out of the mine the signal is found to be caused by a source which is known not to be a hazard to miners, they may return to the working sections.

54. Are there any CO sensors which have been shown to be effective for fire detection in air velocities over 1000 feet per minute?

MSHA's Technical Support is aware of CO sensors that have been tested and shown effective at 4000 feet per minute. Contact MSHA Technical Support, Approval and Certification Center for more information on these sensors.

55. Does the separation of communication lines apply to all mines or only mines that use belt air on working sections and setup and removal areas, and only in areas of the mine where belt air is being used?

The separation of communication lines requirement applies only to mines coursing belt air onto working sections or setup and removal areas. Additionally, this requirement applies only to those working sections and setup and removal areas using belt air courses as intake air. The communication lines must be separated from the working sections or setup and removal areas to the surface.